

Method and Apparatus for Continuous Measurement of The Refractive Index of Fluid

Researchers at the University of South Florida have developed a self-calibrating system for measuring the refractive index of a fluid. The system compensates for fluctuations in source intensity and is capable of being incorporated into a device that utilizes low cost source and detection equipment.

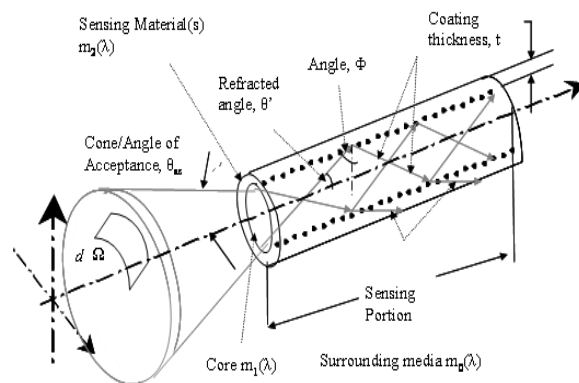
Waveguide optical sensors in which a stripped-cladding or exposed core section comes in contact with a fluid to be measured have found many applications. The parameter of greatest interest measured by these sensors is the real term of the refractive index, and in some cases the measurement a reflectance property of an intermediate structure in the system itself is desired. One of the obstacles in current sensor systems is accurate calibration. To this end, the development of a self-calibrating system which uses the same detection circuitry to simplify both the size and the cost of the instrumentation affords the best solution to both instrumental design simplification as well as overcoming undesired aspects found in conventional systems.

USF inventors have created a system for measuring the refractive properties of fluids comprising a waveguide, optical sensors and detectors. The waveguide in intrinsic sensors, generally cylindrical in shape, contributes to the measured change, by virtue of a modification of its light transmission characteristics as it interacts with the sample. The optical sensor system comprises a source, optically connected to the focusing element, which in turn is optically connected to the optical fiber element. This element conveys light to the detector section. This optical fiber element contains both cladded and non-cladded portions and is connected to the sensing region. This sensing region is then exposed to the environment to be sensed, such as a fluid or a solid state used in corrosion studies. The change in the optical properties determines the parameter to be measured.

ADVANTAGES:

- **Low cost**
- **Good performance in a number of diverse applications**
- **Can withstand harsh environments**
- **Very flexible**
- **Quick and continuous monitoring**

Measure Refractive Property Of A System, Quickly And Continuously



Schematics of our new approach

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